

principle, instances were adduced of its application in the domain of general physics, among which may be mentioned Lord Kelvin's proof of the "gravitational rigidity" of the earth.

In response to an invitation from Lord Rayleigh and a general demand from the assembled guests, Mr. A. F. Yarrow spoke of the needs, national and individual, which it is hoped the tank will help to fill. He was glad to have the opportunity of thanking those who have co-operated in furthering the scheme for the construction of a national tank, and especially the Institution of Naval Architects and Sir Wm. White. As in other branches of engineering practice, scientifically organised experiment is necessary to enable the shipbuilder to take advantage of every possible improvement in design. In the stress of competition with other nations it is imperative that no means of advance should be neglected. Shipbuilders must co-operate in furthering the development of their profession, on which the safety of the nation largely depends. The Admiralty has in the past led the way to progress, and it is important that in the future it should continue to encourage firms who show keenness to initiate improvements.

Lady Bristol was then invited to start the carriage by which the models are towed along the tank, and an experimental run was made and a record obtained of the resistance of a model specially prepared for the experiment. This record, in the opinion of the experts who examined it later, was of an extremely satisfactory character.

In replying on behalf of the Institution of Naval Architects, Lord Bristol spoke of the assistance given by the institution in the work of establishing the tank, and of the important practical results which it is hoped may be the outcome of the work to be undertaken.

At the conclusion of the proceedings connected with the opening ceremony, the visitors were entertained at tea in the grounds of Bushy House, and had the opportunity of visiting other departments of the laboratory.

A description of the tank and its equipment were given in NATURE in the number for June 15 of the current year.

ASSOCIATION OF TECHNICAL INSTITUTIONS.

SUMMER MEETING AT CAMBRIDGE.

THE Association of Technical Institutions holds two public meetings every year, the annual meeting in London in the winter, at which the important business of the year is discussed, and the summer meeting, held in different places throughout the country, which the members regard as much a friendly gathering for the informal interchange of information as a serious conference to listen to learned papers. Nevertheless, at the summer meeting, which was held at Cambridge on Thursday and Friday last, very important questions formed the subject of the papers.

Training of Technical Teachers.

On the first day the association discussed the qualifications and the training of teachers of technological and commercial subjects, papers being submitted by Mr. C. T. Millis, principal of the Borough Polytechnic, S.E., Mr. A. Nixon, principal of the Municipal Evening School of Commerce, Manchester, and Dr. T. Percy Nunn. In view of the extension of the provision in both day and evening schools of instruction in technological and commercial subjects, and of the still further extension which could be brought about by the raising of the school-leaving age, the council of the association felt that a discussion of the qualifications and the training of teachers would serve a useful purpose, and it must be said that if nothing very definite was produced by the papers, or by the subsequent discussion, the subject is a very thorny and difficult one, and any light thrown upon it is helpful. Mr. Millis and Mr. Dixon dwelt most strongly on the need for practical or workshop experience in the teacher, while Dr. Nunn represented more the pedagogic aspect of the case, and insisted on his qualities as a teacher rather than as a skilled workman. All three papers, of course, regarded the combination of the two qualities as ideal.

Mr. Millis summed up the essential and requisite qualifications in the training of a good technical teacher as

follows:—(1) a fairly good education; (2) a liking for teaching others; (3) a sound practical knowledge of the trade or industry which he has to teach—this must be gained from actual experience; (4) a knowledge of the growing trade literature and of the improvements and changes in the methods and processes of manufacture; (5) attendance at classes in the trade subject he has to teach; (6) a sound knowledge of the science or art subjects cognate to the trade or industry; (7) ability to teach both theoretical and practical work; and (8) ability to teach with energy and enthusiasm.

Dr. Nunn admitted at the outset that on one hand the belief was held that all teachers would be the better for training, but that on the other some people regarded the idea of training the highest class of technological teachers as almost an absurdity. The latter view, he contended, was not based upon their universal efficiency. "Some of these teachers have been and are among the most brilliant masters of the craft of exposition. Others have been so amazingly bad that, like ancient heroes, they have become centres of legend. Their reputation for boring and bewildering their students has grown into the cherished mythology of the institution which their genius as investigators illuminated." Yet it was the training of the teachers at the other end of the technological hierarchy—the teachers of workshop arithmetic, science, &c., preparatory to technical instruction proper—which carried us to the heart of one of the most thorny educational problems. School teaching, especially on the scientific and mathematical side, Dr. Nunn remarked, should aim at illuminating the practical value of knowledge in relation to adult activities in which the boy can imaginatively enter. The following quotation from Dr. Nunn's paper sums up his view of the training of the preparatory teacher:—

"If there is to be no break between 'general' and technical education; if the technical ideal is to rule throughout, then there must also be continuity in the training of the teachers. There should be no teachers of mathematics and science who have not come into real touch with the technical spirit in its new and liberal form, and have not added to their academic equipment the practical outlook and sympathy which it generally lacks so woefully. Side by side with them, for the greater part of their training, should be the teachers whose stronger technical bias marks them out for charge of the preparatory technical work of the central elementary and continuation schools. Some actual workshop experience should be an essential constituent of their course of preparation. Finally, we should have the technical teacher proper, the man who comes to his class daily from the workshop or the mill. The ideal would be reached where there was the closest association in training between the man who has real technical knowledge, but is ultimately drawn to teaching, and the man who, having received some training as a teacher, spends the greater part of his life in the actual practice of the trade which he teaches in the technical institute."

The general opinion of the members who took part in the discussion is well represented by Dr. Walmsley, of the Northampton Polytechnic, who declared that the training of the technical teacher was to be sought, not in the classroom, but in the workshop.

The School Attendance Bill.

On Friday morning the members listened to a most able exposition of the Government's Education (School and Continuation Class Attendance) Bill by Mr. P. Sharp, secretary to the St. Helen's Education Committee. Sir H. F. Hibbert, president of the association, occupied the chair, and pointed out that the carrying of the Bill into practice would mean large additions to elementary day schools, large additions to the staff, and considerable increases in the number of evening continuation schools. The Bill would involve the abolition of half-time, and its consideration would therefore bristle with difficult points so far as Lancashire and Yorkshire were concerned. The views of the association are represented in a resolution, passed at the suggestion of Mr. Hewitt (Liverpool), seconded by Principal Reynolds (Manchester), to the effect that, "while cordially approving of the general principles of the Bill in the effort to secure continuous education of

all scholars under suitable conditions to sixteen years of age, this association is of opinion that the provisions of the Bill as introduced require considerable amendment, especially in the direction of fixing more definitely the age of fourteen as the normal age for leaving the day school and in the incidence of compulsion upon employers to afford facilities for the attendance of young people at continuation schools by the reasonable limitation of their hours of labour."

At the close of the business of the meeting the president presented, on behalf of the association, a handsome silver rose bowl and four candlesticks to Dr. R. S. Clay, principal of the Northern Polytechnic Institute, Holloway, "in recognition of his valuable services as honorary secretary from 1907 to 1911."

The master of Caius presided at a dinner on Thursday night at Caius College, and the president of Queen's College received the members on Friday night.

RALPH S. HYAMS.

THE OPENING OF THE NEW BUILDINGS OF THE ROYAL COLLEGE OF SCIENCE FOR IRELAND.

THE scientific work of the Department of Agriculture and Technical Instruction for Ireland received welcome recognition through the opening of the new buildings of the Royal College of Science for Ireland by the King, accompanied by the Queen, as the first act of the royal visit to Dublin on Saturday last, July 8. The ceremony was under the control of the Commissioners of the Board of Public Works, and a picturesque temporary hall had been constructed in the Great Quadrangle, through the open side of which the front of the new college was visible. The vice-president of the Department of Agriculture and Technical Instruction (the Rt. Hon. T. W. Russell, P.C.), the higher officials of the Department, and the professors of the college, had the honour of being presented to their Majesties. The King was pleased to announce that he had conferred a knighthood on Prof. W. Noel Hartley, F.R.S., dean of faculty of the college, whose absence through temporary illness was greatly regretted. The architects, Sir Aston Webb, R.A., and Mr. T. Manley Deane, and the builder, Mr. W. H. McLaughlin, were presented to his Majesty, who knighted Mr. Deane upon the spot. A pleasing feature was the introduction to their Majesties of a deputation of the foremen engaged upon the works.

The Minister in Attendance (the Rt. Hon. Augustine Birrell, P.C.) then asked the King to open the college, and their Majesties, conducted by the officers of the Board of Works, visited the building. Though the ceremony had little of an academic character, the large number of visitors honoured with an invitation must have realised the place taken by science in the educational system now being built up in Ireland, and the honour conferred on Prof. Hartley will be warmly appreciated. When the classes begin work in October in the handsome building now provided, it is hoped that a scheme of correlation may be introduced by which the Irish universities will take advantage of the courses of instruction in applied science in the college. It is important to remember that the maintenance of such courses, from the days of the Science and Art Department onward, has been recognised as a part of the system of public education, and that the new building of the Royal College of Science for Ireland represents visibly the stimulus given to scientific observation and research by Sir Horace Plunkett and his colleagues when they reorganised the agricultural and technical instruction of the country.

THE EUGENICS EDUCATION SOCIETY.

THE annual report of the Eugenics Education Society shows how much progress has been made by the society during the three years of its existence. Besides quick growth of the parent stem, branches have spread from Liverpool to New Zealand; indeed, in New Zealand eugenic ideas seem to be making their way into legislation.

The main feature of the report, however, is the address of the new president, Major Leonard Darwin. Major Darwin emphasises the view that the study of heredity and

its application to sociology is the main function of eugenics. He says:—

"Although the science of heredity is now young, yet certain not hitherto widely recognised conclusions can already be preached with absolute confidence:

"(1) That men are very differently endowed by nature in inherent mental and bodily qualities. . . .

"(2) That in normal conditions, although [individual] children differ widely from their parents, yet each generation closely resembles its predecessors in average inherent qualities; a truth which applies to every nation, and every separable section of a nation.

"(3) That it follows from these premises that, if one nation is more highly endowed than another in inherent qualities, that superiority will remain with it generation after generation in the absence of disturbing causes. . . .

"(4) That if the least naturally gifted sections of a nation are reproducing their kind more rapidly than are those more highly endowed in mental and physical qualities, then the higher are being swamped by the lower, and the nation is decadent. . . .

"(5) Lastly, that whilst every effort to improve the environment of the nation should be made, modern science indicates that the beneficial results on the race of possible changes in external conditions are, in nearly all cases, likely to be far less than was formerly believed to be the case, the advantages being, moreover, probably dependent on the maintenance of the reforms in question; whereas no assignable limit can be placed to the amount of the improvement in the condition of the nation which might in time result from reforms affecting its inherent qualities, the results thus attainable being also of a vastly more permanent character."

In the necessary application of these principles in practice, Major Darwin places in the forefront the need of legislative power to segregate the feeble-minded. He says:—"Here the difficulties encountered ought not to be great, since public opinion is already largely on our side." Doubtless, instructed public opinion is almost or quite unanimous. But, unfortunately, instructed public opinion has little voting power in present political conditions, and the long delay in carrying out the recommendation of the Royal Commission on Mental Defect is impressing on us the unwelcome fact that the Government and Legislature will take no action, even in a case which is urgent and patent to every thinking man, unless there are votes behind it. All the more need exists, therefore, for the efforts of such associations as the Eugenics Education Society to awake the nation to the evils of further inaction.

On the other side, Major Darwin rightly points out that much might be done by the adjustment of taxation to give really effective economic relief to households consisting of large families of sound stock. He also revives the suggestion that the Government as an employer should pay salaries to include an allowance for every living child. As Government employees are usually picked men, this proposal has definite eugenic value.

Major Darwin concludes with a striking passage on the moral question. He says:—

"With regard to the moral aspects of eugenics, what is it which has hitherto been the chief aim of the moral teacher? Has it not been to enforce the necessity of self-sacrifice for the sake of our fellow creatures? The eugenic reformer now demands an enlargement of this code in the light of facts unknown to our ancestors, and pleads for the self-sacrifice of this generation for the sake of the moral and physical welfare of the countless millions of the unborn of the future. May not this be the greatest moral question of all?"

W. C. D. W.

PERUVIAN ANTHROPOLOGY.

UP to the present, the dearth of knowledge regarding the people of Peru has been due to the almost complete lack of anthropological examination of the living subject and to the nature of the material available, consisting largely of skulls accidentally or artificially deformed, normal specimens from this region being rare in our existing collections. We knew in a general way that Peru, shortly before the conquest, was peopled by at least three